High Power Fibre Integrated supercontinuum Sources – Is there anything new ?

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Talk abstract: The high power fibre laser in its many and varied formats, integrated with a non linear optical fibre provides a versatile source of radiation that has been both a scientific and commercial success. Although the underlying physics of the processes utilized in these devices has been well established for twenty-plus years, it has been the dramatic steps forward in technology and the control of the nonlinearity that has led to the rapid uptake of these integrated devices. In addition to the fibre laser, and various systems will be described here, it clearly has been the introduction of the photonic crystal fibre that has been a strong influence on the particular success of the supercontinuum source. The flexibility of the waveguide dispersion and the ability to place the zero dispersion at effectively any wavelength allows matching of pump source to fibre, while the ability to enhance or to effectively eliminate the nonlinearity has uniquely placed the PCF as an indispensable element in the control of non linear optical processes. Accompanied by improved modeling techniques permitting excellent agreement between theory and experiment, improved fibre geometries have been suggested and introduced, some of which will be described here, to allow wavelength extension and power scaling of supercontinuum sources. The power scaling of cw pumped supercontinua will be described , achieving in excess of 100mW/nm in the infrared and also to be reported is the observation of short wavelength extension in 1□m cw pumped systems to 600nm where up to 2mW/nm has been measured. Techniques to extend the short wavelength extent and several fibre laser system will be described .

Speaker biography: Roy Taylor was born in Carrickfergus, N. Ireland in 1949. He obtained a BSc (1st Hons) in physics from the Queen's University of Belfast and commenced his research career at the Queen's University in 1971. In 1973 he transferred to the Optics Section at Imperial College and obtained his PhD in 1974. After spending two years in the Physical Chemistry Department of the Technical University in Munich he returned to Imperial College in 1977 as a research assistant. He established the Femtosecond Optics Group at Imperial College in 1986 and over his career has published more than 380 papers and co-authored over 400 conference presentations. His work and contributions in various aspects of laser research, photonics, optical fibres and non linear optics has been recognised by the Carl Zeiss Research Award, by the Institute of Physics Thomas Young Medal and also by the Imperial College Research Excellence Award. He is currently a Royal Society Wolfson Research Merit Award holder.